

- (b) depleting a nutrient selected from the group consisting of sulfur, iron, and/or manganese from the medium until the culture of cells of [algal] algae microorganism becomes anaerobic and sealing the culture from atmospheric oxygen;
- (c) measuring the rate of cellular respiration of a sample of cells of the [algal] algae microorganism from step (b) in the dark with an O<sub>2</sub> electrode;
- (d) incubating a sample of the [algal] algae microorganism from step (c) in light of saturating intensity of yellow actinic excitation, and measuring the light-saturated rate of O<sub>2</sub> evolution with an O<sub>2</sub> electrode;
- (e) inducing reversible hydrogenase through photosynthesis by controlling the light saturated rate of oxygen production from the culture of cells of [algal] algae microorganism [of step (b)] so that it is equal to or less than a rate of cellular respiration [; and
- (f) collecting] to generate an evolved gas that includes hydrogen.

2. (Amended) The process of claim 1 [further comprising generating] wherein said hydrogen is generated from water and the accumulated endogenous substrate [using light and a hydrogenase]